

Abstract of the Invention

A waveform acquisition system that captures and digitizes a wideband electrical signal through a bank of front end filters, frequency down converters, and conventional digitizers (A/D converters). A software algorithm reconstructs the composite input signal and applies the necessary corrections to remove the effects of hardware impairments. This approach is possible because it uses a class of filters that exhibit the quality of perfect waveform reconstruction, allowing signals whose spectral components overlap multiple filter bands, to be faithfully reconstructed. A calibration generator switched into the input port serves as a reference for quantifying and removing hardware errors. The channelized analog-to-digital converter (ADC) effectively multiplies the bandwidth and sampling rate of the conventional digitizer performance in a single channel by the number of channels in the system.